

REMARKS

This Amendment is filed in response to the Office Action dated April 5, 2005. For the following reasons this application should be allowed and the case passed to issue. No new matter is introduced by this amendment. The amendment to claim 5 is supported by the specification at page 16, lines 28-31. Support for new claims 6 and 10 is found in claim 1, as originally filed. The specification at page 14, lines 8-30, provides support for new claims 7 and 11. New claims 8 and 9 are supported by the Specification at page 16, line 32 to page 17, line 4.

Claims 3-11 are pending in this application. Claims 3-5 are rejected. Claim 5 has been amended in this response. New claims 6-11 have been added.

Claim Rejections Under 35 U.S.C. § 102

Claims 1-5 were rejected under 35 U.S.C. § 102(b) as being anticipated by Besser (U.S. Patent No. 6,368,967). This rejection is traversed, and reconsideration and withdrawal thereof respectfully requested. The following is a comparison between the instant invention, as claimed, and the cited prior art.

An aspect of the present invention, per claim 3, is a semiconductor device comprising a first copper layer. An insulating layer having a via reaching the first copper layer is formed on the first copper layer. A second copper layer is electrically connected to the first copper layer through the via. At least either one of the first and second copper layers contains an inert element.

Another aspect of the present invention, per claim 5, is a semiconductor device comprising a first copper layer. An insulating layer having a via reaching the first copper layer is formed on the first copper layer. A second copper layer is electrically connected to the first copper layer through the via. At least either one of the first and second copper layers contains an

element selected from the group consisting of iron, cobalt, nickel, ruthenium, rhodium, palladium, osmium, iridium, and platinum.

The Examiner asserted that Besser discloses a semiconductor device comprising a first copper layer 1125, insulating layer 1120, second copper layer 1740, via 1220, and a barrier layer 1525A. The Examiner further asserted that at least one of the first and second copper layer contains an inert element and a group 8 element.

Besser, however, does not disclose the claimed semiconductor device because Besser does not disclose that at least one of the copper layers contain an inert element, as required claim 3, and an element selected from the group consisting of iron, cobalt, nickel, ruthenium, rhodium, palladium, osmium, iridium, and platinum, as required by claim 5.

Apparently the Examiner is asserting that because the Besser annealing step takes place in an Ar atmosphere, the copper layer contains Ar. The Examiner has not presented any evidence that the copper layer contains Ar. Apparently, the Examiner has concluded that the Besser et al. copper layer inherently contains Ar.

The fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic. *In re Rijckaert*, 9 F.3d 1531, 1534, 28 USPQ2d 1955, 1957 (Fed. Cir. 1993). "Inherency . . . may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient." *In re Robertson*, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999)(citations omitted). "In relying upon a theory of inherency, the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art." *Ex parte Levy*, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inter. 1990). The Examiner has not

provided a basis in fact and/or technical reasoning to reasonably support the determination that the copper layer of Besser necessarily contains Ar. Because Ar is an inert element, it does not seem likely that Ar would have interacted with the copper layer. Contrary to the Examiner's apparent conclusion, Ar is used in annealing processes because it is inert and will not interact with a substrate being annealed. Thus, one would not expect the copper layer of Besser to contain Ar.

As regards claim 5, apparently the Examiner misunderstood which elements are included in Group 8. It appears the Examiner believes that Group 8 referred to the inert gases. However, as explained in the Specification at page 16, lines 28-31 the Group 8 elements include iron, cobalt, nickel, ruthenium, rhodium, palladium, osmium, iridium, and platinum. Although Applicants believe originally filed claim 5 is clear, definite, and distinguishable over the prior art, Applicants have amended claim 5 to recite the specific elements included in Group 8. The amendment to claim 5 does not narrow scope of claim 5, as it merely lists the elements included in Group 8. There is no teaching in Besser et al. of the copper layers containing any of the elements recited in claim 5.

The factual determination of lack of novelty under 35 U.S.C. § 102 requires the disclosure in a single reference of each element of a claimed invention. *Helifix Ltd. v. Blok-Lok Ltd.*, 208 F.3d 1339, 54 USPQ2d 1299 (Fed. Cir. 2000); *Electro Medical Systems S.A. v. Cooper Life Sciences, Inc.*, 34 F.3d 1048, 32 USPQ2d 1017 (Fed. Cir. 1994); *Hoover Group, Inc. v. Custom Metalcraft, Inc.*, 66 F.3d 399, 36 USPQ2d 1101 (Fed. Cir. 1995); *Minnesota Mining & Manufacturing Co. v. Johnson & Johnson Orthopaedics, Inc.*, 976 F.2d 1559, 24 USPQ2d 1321 (Fed. Cir. 1992); *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051 (Fed. Cir. 1987). Because Besser does not disclose that at least one of the first and second

copper layers of Besser contains an inert element, as required by claim 3, and an element selected from the group consisting of iron, cobalt, nickel, ruthenium, rhodium, palladium, osmium, iridium, and platinum, as required by claim 5, Besser does not anticipate claims 3 and 5.

Applicants further submit that Besser do not suggest the claimed semiconductor devices.

The dependent claims are allowable for at least the same reasons as the independent claims from which they depend and further distinguish the claimed invention. For example, claim 4 further requires that the inert element is Ar. Claims 7 and 11 further require that the barrier layer is a multi-layer structure with a tantalum nitride layer sandwiched by layers selected from the group consisting of tantalum, titanium nitride, titanium silicide, and tungsten nitride. The prior art does not suggest the claimed invention with these additional limitations.

In light of the above Amendments and Remarks, this application should be allowed and the case passed to issue. If there are any questions regarding these remarks or the application in general, a telephone call to the undersigned would be appreciated to expedite prosecution of the application.

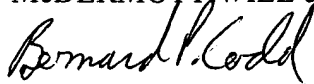
To the extent necessary, a petition for an extension of time under 37 C.F.R. § 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper,

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including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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